HYDRAULIC SHOCK ABSORBER

BACKGROUND OF THE INVENTION

[0001] The present invention relates to hydraulic shock absorbers for motor vehicles and other vibratory objects and more particularly, to an improved piston assembly for use in a hydraulic shock absorber.

[0002] Automotive shock absorbers of the fluid damper type have been in use for many years. Japanese laid-open utility model publication No. 58-94929 discloses a hydraulic shock absorber wherein a valved piston is fit around a piston rod and reciprocatingly received within a cylindrical housing (see Fig. 14). The piston divides an interior of the cylindrical housing into an upper, rebound chamber and a lower, compression chamber. A valve assembly is mounted to a lower surface of a piston head and includes an apertured valve disc (see Fig. 15) normally seated on a valve seat, and a notched valve disc (see Fig. 16) superimposed on the apertured valve disc and adapted to cooperate with the apertured valve disc to collectively form a plurality of ports. An annular outer valve disc (see Fig. 17) cooperates with the apertured valve disc to sandwich the notched valve disc to form a plurality of restrictive orifices in an end of the notches of the nothced valve disc. An annular inner valve disc (see Fig. 18) is placed on the apertured valve disc to normally close off the ports.

[0003] During a rebound stroke, the piston is moved upwardly into the rebound chamber. Resultant pressure increase in the rebound chamber opens the valve assembly to allow damping fluid to flow from the rebound chamber to the compression chamber through a plurality of rebound passages which are formed in the piston head. During a compression stroke, the piston is moved downwardly into the compression chamber. Pressure differential across the valve assembly causes the inner valve disc to deflect to thereby open the ports. This valve arrangement enables the shock absorber to provide a greater damping force at relatively low compression rates.

[0004] The apertured valve disc is formed with a C-shaped aperture (see Fig. 15). A problem with this arrangement is that during a rebound stroke, the inner valve disc is caused to deflect along the C-shaped aperture of the apertured valve disc due to a build-up of back pressure above the piston (as shown by broken line in Fig. 14). A degree of deflection becomes larger as the piston is moved faster. Due to repeated flexing of the inner valve disc in response to fluid